

CLAIMS

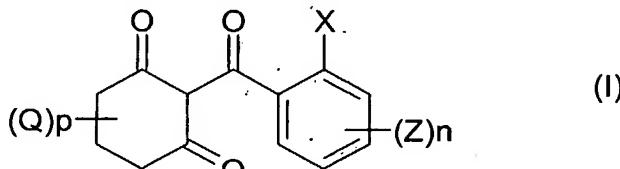
1. A chemically and physically stable suspoemulsion formulation, free from polymeric stabilisers having a molecular weight of between 10,000 and 1,000,000 5 daltons, comprising:

- (i) a continuous phase,
- (ii) an HPPD-inhibiting herbicide insoluble in the continuous phase,
- (iii) a chloroacetamide, and
- (iv) one or more aromatic ethoxylate compounds or derivatives thereof

10 with the exclusion of formulations comprising all of a tristyrylphenol-ethoxylate having 6-14 mol ethoxylate, in non-ionic form, and a tristyrylphenol-ethoxylate having 14-18 mol ethoxylate in form of its sulphate or phosphate, in anionic or acid form, and a dialkyl-sulfosuccinate salt.

15 2. A suspoemulsion formulation according to claim 1, wherein the continuous phase is selected from the group consisting of water, glycol or alcohol.

3. A suspoemulsion formulation according to any one of claims 1 or 2, wherein the HPPD-inhibiting herbicide is a compound of formula (I)


(I)

20 wherein X represents a halogen atom; a straight- or branched-chain alkyl or alkoxy group containing up to six carbon atoms which is optionally substituted by one or more groups -OR¹ or one or more halogen atoms; or a group selected from nitro, cyano, -CO₂R², -S(O)_mR¹, -O(CH₂)_rOR¹, -COR², -NR²R³, -SO₂NR₂R³, -CONR²R³, -CSNR²R³ and -OSO₂R⁴;

25 R¹ represents a straight- or branched-chain alkyl group containing up to six carbon atoms which is optionally substituted by one or more halogen atoms;

R^2 and R^3 each independently represents a hydrogen atom; or a straight- or branched-chain alkyl group containing up to six carbon atoms which is optionally substituted by one or more halogen atoms;

R^4 represents a straight-or branched-chain alkyl, alkenyl or alkynyl group containing up to six carbon atoms optionally substituted by one or more halogen atoms; or a cycloalkyl group containing from three to six carbon atoms;

each Z independently represents halo, nitro, cyano, $S(O)_mR^5$, $OS(O)_mR^5$, C_{1-6} alkyl, C_{1-6} alkoxy, C_{1-6} haloalkyl, C_{1-6} haloalkoxy, carboxy, C_{1-6} alkylcarbonyloxy, C_{1-6} alkoxycarbonyl, C_{1-6} alkylcarbonyl, amino, C_{1-6} alkylamino, C_{1-6} dialkylamino having

10 independently the stated number of carbon atoms in each alkyl group, C_{1-6} alkylcarbonylamino, C_{1-6} alkoxycarbonylamino, C_{1-6} alkylaminocarbonylamino, C_{1-6} dialkylaminocarbonylamino having independently the stated number of carbon atoms in each alkyl group, C_{1-6} alkoxycarbonyloxy, C_{1-6} alkylaminocarbonyloxy, C_{1-6} dialkylcarbonyloxy, phenylcarbonyl, substituted phenylcarbonyl, phenylcarbonyloxy, 15 substituted phenylcarbonyloxy, phenylcarbonylamino, substituted phenylcarbonylamino, phenoxy or substituted phenoxy;

R^5 represents a straight- or branched-chain alkyl group containing up to six carbon atoms which is optionally substituted by one or more halogen atoms; each Q independently represents C_{1-4} alkyl or $-CO_2R^6$ wherein R^6 is C_{1-4} alkyl;

20 m is zero, one or two;

n is zero or an integer from one to four;

r is one, two or three; and

p is zero or an integer from one to six.

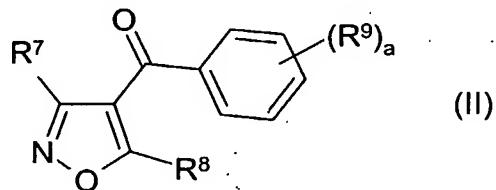
25 4. A suspoemulsion formulation according to claim 3, wherein X is chloro, bromo, nitro, cyano, C_1-C_4 alkyl, $-CF_3$, $-S(O)_mR^1$, or $-OR^1$; each Z is independently chloro, bromo, nitro, cyano, C_1-C_4 alkyl, $-CF_3$, $-OR^1$, $-OS(O)_mR^5$ or $-S(O)_mR^5$; n is one or two; and p is zero.

30 5. A suspoemulsion formulation according to claim 3 or 4, wherein the 2-(substituted benzoyl)-1,3-cyclohexanedione of formula (I) is selected from the group

consisting of 2-(2'-nitro-4'-methylsulphonylbenzoyl)-1,3-cyclohexanedione, 2-(2'-nitro-4'-methylsulphonyloxybenzoyl)-1,3-cyclohexanedione, 2-(2'-chloro-4'-methylsulphonylbenzoyl)-1,3-cyclohexanedione, 4,4-dimethyl-2-(4-methanesulphonyl-2-nitrobenzoyl)-1,3-cyclohexanedione, 2-(2-chloro-3-ethoxy-4-methanesulphonylbenzoyl)-5-methyl-1,3-cyclohexanedione and 2-(2-chloro-3-ethoxy-4-ethanesulphonylbenzoyl)-5-methyl-1,3-cyclohexanedione.

6. A suspoemulsion formulation according to claim 5, wherein the 2-(substituted benzoyl)-1,3-cyclohexanedione is 2-(2'-nitro-4'-methylsulphonyl benzoyl)-1,3-cyclohexanedione.

7. A suspoemulsion formulation according to any one of claims 1 or 2, wherein the HPPD-inhibiting herbicide is an isoxazole compound of formula (II)



15 wherein R⁷ is hydrogen or -CO₂R¹⁰;
 R⁸ is C₁₋₄ alkyl or C₃₋₆ cycloalkyl optionally substituted by C₁₋₆ alkyl;
 R⁹ is independently selected from halogen, nitro, cyano, C₁₋₄ alkyl, C₁₋₄ haloalkyl, C₁₋₆ alkoxy, C₁₋₄ haloalkoxy, -(CR¹¹R¹²)_cS(O)_bR¹³, -S(O)_bR¹³, -OSO₂R¹³ and -N(R¹⁴)SO₂R¹³;
 20 or two groups R⁹, on adjacent carbon atoms of the phenyl ring may, together with the carbon atoms to which they are attached, form a 5- or 6-membered saturated or unsaturated heterocyclic ring containing up to three ring heteroatoms selected from nitrogen, oxygen and sulphur, which ring may be optionally substituted by one or more groups selected from halogen, nitro, C₁₋₄ alkyl, C₁₋₄ alkoxy, C₁₋₄ haloalkyl, C₁₋₄ haloalkoxy and -S(O)_bR¹³, it being understood that a sulphur atom, where present in the ring, may be in the form of a group -SO- or -SO₂-;

25 R¹⁰ is C₁₋₄ alkyl;
 R¹¹ and R¹² are independently hydrogen or C₁₋₄ alkyl;
 R¹³ is C₁₋₄ alkyl, or phenyl or benzyl, each of phenyl and benzyl optionally 30 bearing from one or five substituents which may be the same or different selected from

the group consisting of halogen, C₁₋₄ alkyl, C₁₋₄ alkoxy, C₁₋₄ haloalkyl, C₁₋₄ haloalkoxy, nitro and -S(O)_bCH₃;

R¹⁴ is hydrogen or C₁₋₆ alkyl;

a is an integer from one to five;

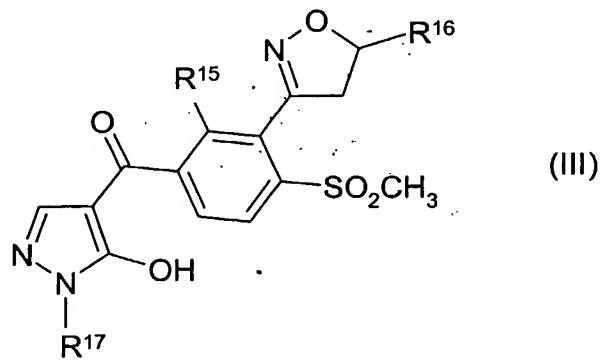
5 b is zero, one or two; and

c is one or two (where c is two, the groups (CR¹¹R¹²) may be the same or different.

8. A suspoemulsion formulation according to claim 7 wherein R⁷ is hydrogen; R⁸ is cyclopropyl; R⁹ is halogen (preferably chloro), -S(O)_bCH₃, or C₁₋₄ haloalkyl (preferably trifluoromethyl); and a is two.

9. A suspoemulsion formulation according to claim 7 or 8 wherein the isoxazole compound is selected from the group consisting of 5-cyclopropyl-4-(2-methylsulfonyl-4-trifluoromethyl)benzoylisoxazole (isoxaflutole) and 4-(2-chloro-4-methylsulphonyl)benzoyl-5-cyclopropylisoxazole (isoxachlortole).

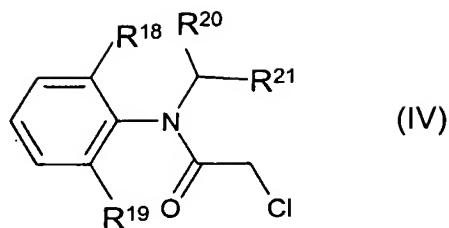
10. A suspoemulsion formulation according to any one of claims 1 or 2, wherein the HPPD-inhibiting herbicide is a compound of formula (III)



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wherein R¹⁵ is C₁₋₂ alkyl or chloro; R¹⁶ is hydrogen or C₁₋₄ alkyl; and R¹⁷ is C₁₋₄ alkyl.

11. A suspoemulsion formulation according to any one of claims 1 to 10, wherein the chloroacetamide is a compound of formula (IV)



wherein R¹⁸ is hydrogen, methyl or ethyl; R¹⁹ is hydrogen or ethyl; R²⁰ is hydrogen or methyl; and R²¹ is methyl, methoxy, methoxymethyl, ethoxy, or butoxy.

5 12. A suspoemulsion formulation according to any one of claims 1 to 11, wherein the aromatic ethoxylate compound is selected from the group consisting of di- or tri-styrylphenol ethoxylates, and phosphates, sulphates and salts thereof.

10 13. A suspoemulsion formulation according to any one of claims 1 to 12, wherein the formulation has a pH of 5 or less.

15 14. A suspoemulsion formulation according to any one of claims 1 to 13, wherein the formulation further comprises one or more additional active ingredients selected from the group consisting of herbicides, fungicides, insecticides, safeners or antidotes.

16 15. A suspoemulsion formulation according to claim 14, wherein the additional active ingredient is a triazine herbicide.

20 16. A suspoemulsion formulation according to claim 14 wherein the additional active ingredient is a safener or antidote.

17. A suspoemulsion formulation according to claim 14, wherein the additional active ingredient comprises at least a triazine herbicide and a safener or antidote compound.

25 18. A suspoemulsion formulation according to any one of claims 1 to 17, wherein the formulation further comprises an electrolyte.

19. A method for controlling the growth of undesirable vegetation comprising applying to the locus of said undesirable vegetation a suspoemulsion formulation according to any one of claims 1 to 18.